



MiniPCI gets real

posted 8/31/98

NEWS

The Mini PCI Roundtable, a group of mobile computing companies, introduced a proposed standard for Mini PCI. Mini PCI is a standard that will allow Mini PCI cards, about 3" by 2" and less than 1/4" thick. The specification will mainly allow modems and network interface cards to be standardized and placed in laptops. The small cards will support standard PCI signals, drivers, and much of the same electronics. The main advantages of these cards are standardization and easy serviceability.

The standard was worked on for almost a full year before being proposed to the PCI Special Interest Group. The PCI SIG has already granted the specification preliminary approval.

OPINION

When you buy a laptop for business, you also have to buy a PCMCIA modem and network card to make it truly functional. Hopefully, this will fix that situation and allow more built-in modems and network cards.

PCMCIA sucks. How do you connect anything to such a tiny card? You use crappy little plastic cords that snap and get lost. Let's just put the modem and NIC inside and get rid of PCMCIA. If I want to connect anything else, I'll just use a USB port.

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USI 802.11b NIC Product Family-A Specifications


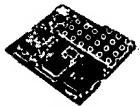


Features

- Fully IEEE 802.11b compliant, WiFi compatible
- Auto-fallback data rate with high-speed wireless connection up to 11 Mbps
- Automatic output power range for maximum distances up to 500 m (1750 ft)
- Up to 128-bit encryption key for data protection and security
- Internal and external antenna diversity support
- Easy to install and use
- Optional with 56K modem for easy Internet access (MiniPCI Type IIIB only)

Specifications

Description	Specification
Data Rates	1, 2, 5.5, 11 Mbps
Network Standard	IEEE 802.11b
Frequency Band	ISM 2.400 – 2.4835 GHz
Wireless Medium	Direct Sequence Spread Spectrum (DSSS)
Media Access Protocol	CSMA/CA (Collision Avoidance) with ACK
Modulation	DBPSK @ 1 Mbps, DQPSK @ 2 Mbps, CCK @ 5.5 and 11 Mbps
Operating Channels	U.S. & Canada: 11 channels, Europe: 13 channels, Japan: 14 channels
RF Characteristics	Receive Sensitivity (BER < 10E-5)
	11 Mbps -82 dBm
	5.5 Mbps -87 dBm
	2 Mbps -91 dBm
	1 Mbps -94 dBm
Delay Spread (FER < 1%)	
65 ns	
225 ns	
400 ns	
500 ns	
Typical Output Power	15 dBm
Security	64/128-bit WEP
Range Performances	Open Office
	Semi-Open Office
	Close Office
	11 Mbps 160 m (525 ft)
	50 m (165 ft)
	25 m (80 ft)
	5.5 Mbps 270 m (885 ft)
	70 m (230 ft)
	35 m (115 ft)
	2 Mbps 400 m (1300 ft)
	90 m (300 ft)
	40 m (130 ft)
	1 Mbps 550 m (1750 ft)
	115 m (375 ft)
	50 m (165 ft)

Family Specifications

Description	PCMCIA Card	Mini PCI Card	CompactFlash Card	USB
System Interface	PC Card Type-II	Mini PCI Type IIIA & IIIB	CompactFlash Type I	USB v1.1
Power Consumption	Rx	185 mA	185 mA	245 mA
	Tx	285 mA	285 mA	360 mA
	Standby	9 mA	16 mA	10 mA
Supply Voltage	5.0 VDC	3.3 VDC	3.3 VDC	5.0 VDC
Operating Temperature (ambient)	0 - 55°C	0 - 60°C	0 - 60°C	0 - 40°C
Max. Humidity (non-condensing)	95%	95%	95%	95%
Modem support	none	V92 modem up to 56Kbps for Type IIIB	none	none
Software Supported	MS Windows 98/Me/2000/NT4.0/XP/CE Linux, Mac OS	MS Windows 98/Me/2000/XP Linux	MS Windows CE 3.0	MS Windows 98/Me/2000
Regulatory Approvals	FCC Part 15.247, FCC Part 15B, EN300 328, EN60950, ARIB STD-T66	FCC Part 15.247, FCC Part 15B, EN300 328, EN60950, ARIB STD-T66	FCC Part 15.247, FCC Part 15B, EN300 328, EN60950, ARIB STD-T66	FCC Part 15.247, FCC Part 15B, EN300 328, EN60950, ARIB STD-T66
				

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USI 802.11b NIC Product Family-P Specifications

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Features

- Fully IEEE 802.11b compliant, WiFi compatible
- Auto-fallback data rate with high-speed wireless connection up to 11 Mbps
- Automatic output power range for maximum distances up to 500 m (1750 ft)
- Up to 128-bit encryption key for data protection and security
- Easy to install and use

Specifications

Description	Specification
Data Rates	1, 2, 5.5, 11 Mbps
Network Standard	IEEE 802.11b
Frequency Band	ISM 2400 – 2483.5 MHz
Wireless Medium	Direct Sequence Spread Spectrum (DSSS)
Media Access Protocol	CSMA/CA (Collision Avoidance) with ACK
Modulation	DBPSK @ 1 Mbps, DQPSK @ 2 Mbps, CCK @ 5.5 and 11 Mbps
Operating Channels	U.S. & Canada: 11 channels, Europe: 13 channels, Japan: 14 channels
Security	64/128-bit WEP

Family Specifications

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Description	PCMCIA Card				Mini PCI Card				Low Profile	
System Interface	PC Card Type-II				Mini PCI 1.0				PC	
Typical Output Power	14.5 dBm				14.5 dBm				15	
Power Consumption	Rx				220 mA				22	
	Tx				300 mA				32	
	Standby				75 mA				75	
Range (Mbps)	11	5.5	2	1	11	5.5	2	1	11	5.5
Open Office (m)	160	270	400	550	150	250	350	500	120	210
Semi-Open Office (m)	50	70	90	115	40	75	90	115	40	70
Closed Office (m)	25	35	40	50	25	35	40	50	25	35
Receive Sensitivity (BER < 10E-5) (dBm)	-82	-85	-88	-91	-83	-86	-89	-92	-83	-86
Delay Spread (FER < 1%) (ns)	125	250	500	500	125	250	500	500	125	250
Supply Voltage	3.3 VDC				3.3 VDC				3.3	
Operating Temperature (ambient)	0 - 60° C				0 - 60° C				0 -	
Max. Humidity (non-condensing)	95%				90%				9	
Software Supported	MS Windows 98/Me/2000/NT4.0/XP				MS Windows 98/Me/2000/XP				MS Window 98/Me/2000	
Regulatory Approvals	FCC Part 15.247, FCC Part 15B, EN300 328, EN60950, ARIB STD-T66				FCC Part 15.247, FCC Part 15B, EN300 328, EN60950, ARIB STD-T66				FCC Part 15, FCC Part 15B, EN300 328, ARIB STD-T66	

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The USI 802.11a NIC family includes a complete line of adapter, including PC Card and Mini PCI for both notebook and desktop wireless connectivity. This family enables organizations to integrate the mobility and flexibility of wireless local area networking into their Internet and Intranet resources.

- Fully IEEE 802.11a compliant
- Auto-fallback data rates up to 54 Mbps as well as extended rates up to 72 Mbps in turbo mode
- Automatic output power range for maximum distances up to 500 m (1750 ft)
- Up to 152-bit encryption key for data protection and security
- Easy to install and use

Description	PCMCIA Card	Mini PCI Card
System Interface	PC Card Type-II	Mini PCI Type IIIA/IIIB
Data Rates	Standard Mode 6, 9, 12, 18, 24, 36, 48, 54 Mbps Turbo Mode 12, 18, 24, 36, 48, 72 Mbps	
Network Standard	IEEE 802.11a	
Frequency Band	5.15 – 5.35 GHz U-NII Frequency Band	
Wireless Medium	Orthogonal Frequency Division Multiplexing (OFDM)	
Media Access Protocol	CSMA/CA (Collision Avoidance) with ACK	
Modulation	BPSK, QPSK, 16 QAM, 64 QAM	
Operating Channels	U.S. & Canada: 8 channels/3 channels in turbo mode, Japan: 5 channels	
Typical Output Power	40 - 200 mW dependent on frequency channel	
Security	64/128-bit WEP	
Supply Voltage	3.3 VDC	
Operating Temperature (ambient)	0 - 60° C	
Humidity	5 - 95%	

(non-condensing)	
Software Supported	MS Windows 98/Me/NT4.0/2000/XP
Regulatory Approvals	FCC Part 15B, TELEC

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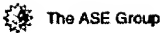


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Re: Does miniPCI bus support several cards

From: yohan baillot

Date: Wed, 17 Apr 2002 16:08:31 -0400

From:

http://www.euro.dell.com/countries/eu/enu/gen/topics/vectors_2001-legacy.htm

PCI form factors have also evolved. The original specification allowed 20 devices on the main board and in option slots. Variations were allowed in the size of the option boards, but the I/O and chassis interfaces were fixed. The progress of semiconductor technology in miniaturizing components coupled with the growing demand for options in mobile systems drove the definition of miniPCI as a PCI bus of much smaller physical size, but with the same electrical and software interface.

this suggest to me that a miniPCI backplane should work in theory.

Yohan

At 02:17 PM 4/17/2002 -0500, Doug Sutherland wrote:

>Yohan,

>

>I have not seen any backplanes and I have been wondering the same thing. I have seen PCI to Mini PCI adapters. So

>I think its possible to make backplanes, but I don't

>think anyone is doing that yet. That's not surprising

>because most of these cards are going into notebooks.

>The other thing I have been looking for is a Mini PCI

>to PCMCIA adapter, no luck so far.

>

> -- Doug

>

>

>

>yohan baillot wrote:

>

> > It seems like every manufacturer having a miniPCI connector on their board

> > support only one card. Does anybody knows how to install several miniPCI

> > cards on the same board. Is there some kind of backplane existing?

>

>--

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VECTORS TECHNOLOGY BRIEF

Mini PCI Technology

September 1999

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Steven Wallace, Senior Technologist

Since it first appeared on PCs in 1993, the Peripheral Component Interconnect (PCI) bus has become the industry-standard, high-speed input/output (I/O) bus for many types of personal computers. Over the years the PCI special interest group (SIG) has advanced the specification to deliver higher clock rates, wider buses, 3-volt cards, hot-plug capability, and many other features. Today the industry is addressing the special requirements of portable computers with the proposed Mini PCI specification for integrated communications devices. Mini PCI defines a very small internal card functionally identical to standard desktop computer PCI cards. Its open architecture based on standard PCI technology will enable Dell to offer more flexible communications configurations to customers.



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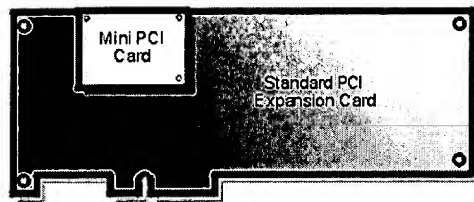
Transitioning from Current Proprietary Designs

Mobile systems have different requirements for expansion capability than those of desktops. Although mobile systems have the electrical equivalent of a desktop PCI bus, desktop PCI cards are too large and require too much power to be used on a portable computer. As a result, portable computer makers wishing to implement integrated devices such as network interface controllers (NICs) and modems must use proprietary form factors connected to the legacy Industry Standard Architecture (ISA) bus. The problem with this approach is that the PC industry is quickly transitioning from the aging ISA bus to higher-bandwidth, more manageable Plug and Play buses, particularly the standard PCI bus. Portable computer makers prefer standards-based buses like the PCI bus because proprietary designs require additional work for regulatory agency compliance and lack the competitive choice and pricing benefits associated with high-volume production. A previous industry effort, the Small PCI specification, attempted to standardize integrated small form factor PCI cards. It did not gain widespread acceptance because the Small PCI cards were too large to provide a viable alternative to existing PC Card and CardBus solutions.

Mini PCI Standard

In 1998, the Mini PCI Roundtable was formed to develop standard form factors for internal PCI boards (or *Mini PCI cards*) for space-constrained systems. Because an increasing number of portable computers include integrated communications devices, the Mini PCI Roundtable concentrated on form factors for internal communications devices such as modems, network adapters, or combination devices. The resulting specification outlines industry-standard form factors that allow portable computer

manufacturers to choose from multiple suppliers and receive precertified and tested devices. Figure 1 compares the approximate size of a Mini PCI card to a standard full-size PCI card.



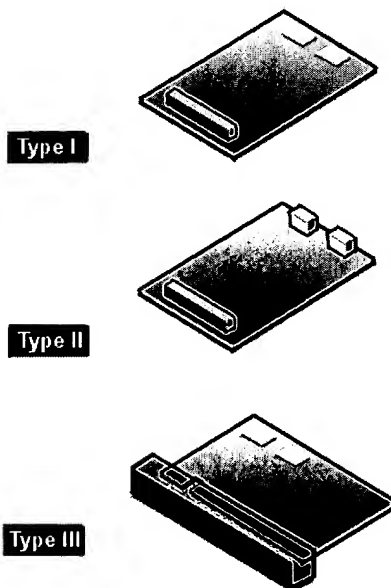
Source: 3Com Corporation

Figure 1. Approximate Size of Mini PCI Card Compared to Standard PCI Expansion Card

Because the new standard is expected to be widely accepted by the industry, customers should receive the benefits of a competitive market in which prices tend to be lower, quality tends to be higher, and products are brought to market more quickly. Currently, the PCI SIG has taken over the specification and it may be finalized as early as October 1999. Meanwhile, Mini PCI cards based on the proposed specification have appeared on the market.

Mini PCI Card Types

The proposed specification defines three types of Mini PCI cards. All three have different form factors (shown in Figure 2) and all are intended to be installed by manufacturers or service technicians rather than users. These different form factors allow portable computer makers considerable design flexibility.

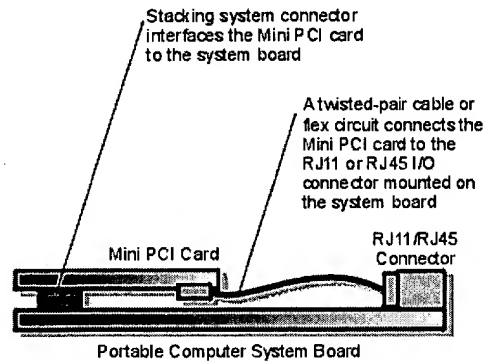


Source: 3Com Corporation

Figure 2. Types I, II, and III Mini PCI Card Form Factors

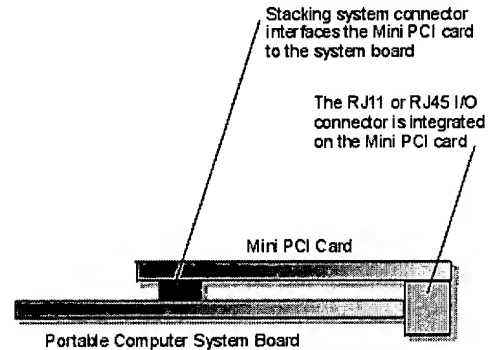
Type I cards use a cable to connect to the phone (RJ11) or network (RJ45) connectors located at the edge of the portable computer chassis or docking station (see Figure 3). This approach allows designers to place the card away from the edge of the chassis. In

contrast, Type II cards include built-in RJ11 and/or RJ45 I/O connectors (see Figure 4). These cards must be located at the edge of the computer or docking station so that the RJ11 and RJ45 ports can be mounted for external access.



Source: 3Com Corporation

Figure 3. I/O Connectors for Type I Mini PCI Cards

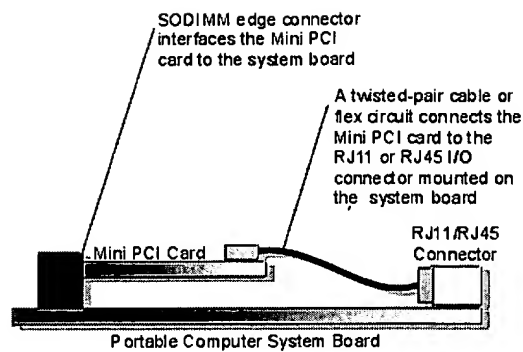


Source: 3Com Corporation

Figure 4. I/O Connectors for Type II Mini PCI Cards

Both Type I and Type II cards connect to the system board via a miniature 100-pin stacking connector with a 4-millimeter (mm) minimum stacking height.

Instead of the stacking connector used on Type I and Type II cards, Type III cards have a card-edge connector similar to that used by small outline, dual in-line memory modules (SODIMMs). Figure 5 illustrates this approach. Type III cards can use a cable to connect to I/O connectors at the edge of the chassis (like Type II cards) or they can route the I/O through the card-edge connector, in which case the signals are routed through the system board to the I/O jacks.



Source: 3Com Corporation

Figure 5. I/O Connectors for Type III Mini PCI Cards

The Type III card-edge connector has 124 pins and is 3 mm in height. The additional 24 pins provide the extra signals required to route I/O back through the system connector. Type III cards have a lower profile than Types I and II, allowing portable computer makers to design a smaller chassis. As a result, Type III cards are expected to be the most commonly implemented.

The system connectors for all three Mini PCI card types provide electrical signals that form a PCI bus identical to that formed by desktop PCI cards. Additional sideband signals accommodate communications signals such as audio and AC97 AC-Link. The audio signals allow a modem to be connected to the sound system of the computer. The AC-Link signals allow the modem to be implemented as either an AC97 Host Signal Processing (HSP) modem or as a modem on the PCI bus. The I/O connections such as modem "tip and ring" (transmit and receive wires) and local area network (LAN) I/O are routed to the RJ11 or RJ45 connectors depending on the Mini PCI card type.

In addition to these sideband signals, an area is defined to allow for connecting cellular and integrated services digital network (ISDN) modems. Although the Mini PCI specification initially addresses only modem and network communications, it is designed to be extensible to accommodate new portable computer capabilities.

Each type of Mini PCI card has two subclasses to allow further flexibility for system designers. Table 1 summarizes the size and I/O connection characteristics of each subclass.

Table 1. Summary of Mini PCI Card Types

Mini PCI Card Types	Size in mm (width x length x depth)	I/O Connection	System Connector
Type IA	45 x 70 x 7.5	Link via cable to external I/O connectors	100-pin stacking connector with a 4-mm minimum stacking height
Type IB	45 x 70 x 5.5		
Type IIA	45 x 78 x 14.5	Built-in I/O connectors	Same as Type I
Type IIB	Same as Type IIA*		
Type IIIA	50.8 x 59.6 x 4.9	Link via cable to external I/O connectors or route I/O through card-edge connector	124-pin card-edge connector; 3 mm in height
Type IIIB	44.45 x 59.6 x 4.9		

*Types IIA and IIB have the same dimensions, but each has a different cavity space to accommodate RJ11 and/or RJ45 jacks that are recessed into the system board.

Special Design Considerations

Portable computer designers must carefully select the Mini PCI card type used in a system. Once a system board is designed for a particular Mini PCI card type, with a few exceptions, it can only be equipped with that card type. For instance, a portable computer designed for a Type IB card can only be equipped with a Type IB card. There are two exceptions to this limitation. With Types I and III cards PC makers can gain more flexibility by designing the system around the larger form factor within a card type, such as Type IIIA (50.8 mm x 59.6 mm x 4.9 mm). In this case, the system can accommodate either a Type IIIA card or the smaller Type IIIB (44.45 mm x 59.6 mm x 4.9 mm) card. However, the system could not accommodate Types I or II cards.

Advantages to Customers

The Mini PCI card will reduce the cost of ownership of portable computers and allow more flexibility in choosing communication devices. Current proprietary and vendor-specific integrated communications devices are not designed to be replaced when they fail or to be upgraded when technology changes. In contrast, depending on the particular system design, a service technician may be able to replace a standard Mini PCI card if it fails or requires upgrading, rather than replacing the entire system board. And, customers will be able to choose from multiple vendors.

Standardizing these devices will also speed the introduction of new systems to the market. Current proprietary solutions require extensive redesign and regulatory approval work when developing new systems. Finally, Mini PCI cards allow Dell to provide customers even more flexibility in its "build-to-order" manufacturing process. When purchasing systems, customers will be able to choose from several possible communication options, which can be installed when the system is manufactured.

Conclusion

While Mini PCI cards were developed mainly with portable computer requirements in mind, the cards can be used in other PC platforms, including desktop systems. Customers who currently purchase systems with communications integrated into the system board would have the flexibility of choosing among several Mini PCI card choices. Like the portable computer platform, service technicians may be able to replace or upgrade the Mini PCI cards in these systems, depending on the system design. In other cases, system chassis size may be reduced because it no longer has to accommodate larger PCI add-in communications cards.

The Mini PCI standard is extensible. Future Mini PCI cards are expected to support new communications technologies such as G.lite (a variation of asymmetric digital subscriber line [ADSL]), Institute of Electrical and Electronics Engineers (IEEE) 1394, and the developing Bluetooth wireless networking standard. Combination Mini PCI cards that support more than one communications technology are also expected. For example, one Mini PCI card could provide a V.90 modem and a G.lite modem.

Dell is committed to industry standards, such as Mini PCI, that provide customers with cost-effective and flexible alternatives to proprietary solutions. Mini PCI cards complement the Dell build-to-order model in which systems are manufactured to customer specifications. To give customers a wider choice of communications options, Dell plans to offer Mini PCI cards on selected Dell™ systems by the end of 1999.

For More Information

For more information on Mini PCI cards, see the PCI SIG Web site at www.pcisig.com.

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